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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,495	03/24/2006	Kazumi Naito	Q77806	9323

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EXAMINER	
CRAWFORD, LATANYA N	

ART UNIT	PAPER NUMBER
2809	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,495	NAITO, KAZUMI	
	Examiner	Art Unit	
	LaTanya Crawford	2809	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/24/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☒ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *March 24, 2006; July 6, 2007*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. **Claim 2** is objected to because of the following informalities: island-like shape and /or feather-like shape does not give definite structure. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 2, 5, 6, 8, 9, 14, 15, 16, 17, 18, & 19** are rejected under 35 U.S.C 102***(b)*** as being anticipated by **Tsuchiya (US Patent 4,943,892).**

Regarding claim 1, Tsuchiya et al. discloses a method for producing a capacitor comprising, as one electrode, an electric conductor **1** having formed on the surface thereof a dielectric layer **3 (column 5, lines 10-11)** and, as the other part electrode, a semiconductor layer **5** formed on the electric conductor by energization **(column 5, lines 43-48)** using the electric conductor as the anode **(fig. 3)**, wherein fine protrusions **4 (column 5, lines 26-27)** are formed on the dielectric layer before energization **(fig. 1a; column 5, lines 28-29).**

Regarding claim 2, Tsuchiya et al. discloses wherein the fine protrusion **4** is in an island-like shape and/or in a feather-like shape **(column 5, lines 26-27)**.

Regarding claim 5, wherein the fine protrusion **4** is at least one member selected from a metal oxide, a metal salt, a transition element-containing inorganic compound, a transition element-containing organic compound and a polymer compound **(column 5, lines 26-27)**.

Regarding claim 6, wherein the electric conductor **1** is at least one member selected from a metal, an inorganic semiconductor, an organic semiconductor and carbon or a mixture thereof **(column 4, lines 10-14).**

Regarding claim 8, wherein the dielectric layer mainly comprises at least one member selected from metal oxides such as Ta_2O_5, Al_2O_3, TiO_2 and Yb_2O_5 **(column 5, lines 9 & 11).**

Regarding claim 9, wherein the semiconductor layer **5** is at least one member selected from an organic semiconductor layer and an inorganic semiconductor layer **(column 2, lines 4-5; column 4, lines 20-21; column 5, lines 28-29).**

Regarding claim 14, wherein the inorganic semiconductor is at least one compound selected from molybdenum dioxide, tungsten dioxide, lead dioxide and manganese dioxide **(column 1, lines 51-52)**.

Regarding claim 15, wherein the electrical conductivity of the semiconductor **5** is from 10^{-2} to 10^3 S/cm **(column 10, lines 10-13)**.

Regarding claim 16, a capacitor produced by the production method claimed in claim 1**(column 3, lines 22-29 & column 5, lines 26-27).**

Regarding claim 17, wherein the impregnation ratio of the semiconductor is 85% or more **(column 9, lines 8-11).**

Regarding claim 18, an electronic circuit using the capacitor claimed in claim 16 **(column 1, lines14-18).**

Regarding claim 19, an electronic device using the capacitor claimed in claim 16 **(column 1, lines14-18).**

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 3 &4** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tsuchiya (US Patent 4,943,892)** in view of **Unno (US Patent 7,202,495 B2).**

Regarding claim 3, Tsuchiya et al. invention discloses all of the claimed limitations from above but fails to teach wherein the fine protrusion has a width of 0.1 to 60 nm.

However, Unno et al. teaches the fine protrusion having an average diameter of 0.15 to 80 nm **(column 7, lines 35-37).**

6. Given the teachings of Unno et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of producing an electrolytic capacitor of Tsuchiya et al. with protrusions with an average diameter of

0.15 to 80 nm taught by Unno et al. Doing so would provide a reduction in current leakage and improved yield of the capacitor.

Regarding claim 4, Tsuchiya et al. invention discloses all of the claimed limitations from above and further teaches wherein the majority of the fine protrusions are present on the outer surface of the electric conductor and on the inner pore surface **(fig 3; column 5, lines 26-27)** but fails to teach within 10 μm from the outer surface.

However, Unno et al. teaches protrusions within 10 μm from the outer surface **(column 7, lines 32-34)**.

7. Given the teachings of Unno et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of producing an electrolytic capacitor with a manganese dioxide layer having protrusions of Tsuchiya et al. with protrusions having a height preferably in the range of 0.4 to 120 nm taught by Unno et al. Doing so would further provide a reduction in current leakage and improved yield of the capacitor.

8. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Tsuchiya (US Patent 4,943,892)** in view of **Kobatake (US Patent 6,368,363 B1)**.

Regarding claim 7, Tsuchiya et al. invention discloses all of the claimed limitations from above except for wherein the electric conductor is a laminated body having, as the surface layer, at least one member selected from a metal, an inorganic semiconductor, an organic semiconductor and carbon, or a mixture thereof.

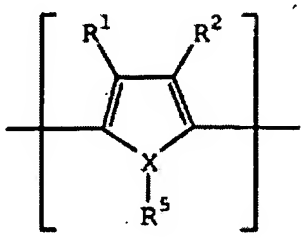
However, Kobatake et al. teaches the electric conductor is a laminated body **(column 3, lines 55-59; column 6, lines 9-11)** having, as the surface layer an organic semiconductor and carbon **(column 8, lines 14-16)**.

9. Given the teachings of Kobatake et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the electrolytic capacitor having an electric conductor made of valve metal or a sintered product of Tsuchiya et al. with a laminated electric conductor consisting of insulating tape taught by Kobatake et al. Doing so would prevent damage to the anode foil further providing excellent performance and reliability.

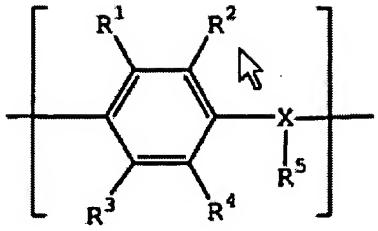
10. **Claims 10, 11, 12, & 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tsuchiya (US Patent 4,943,892)** in view of **Jasne (US Patent 4,724,053)**.

Regarding claim 10, Tsuchiya et al. invention discloses all of the claimed limitations from above but fails to teach the organic semiconductor is at least one member selected from an organic semiconductor comprising benzopyrroline tetramer and chloranil, an organic semiconductor mainly comprising tetrathiotetracene, an organic semiconductor mainly comprising tetracyano-quinodimethane, and an organic semiconductor mainly comprising an electrically conducting polymer obtained by doping a dopant into a polymer containing a repeating unit represented by the following formula

(1) or (2):



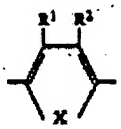
(1)



(2)

wherein R1 to R4 each independently represents a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms or an alkoxy group having from 1 to 6 carbon atoms, X represents an oxygen atom, a sulfur atom or a nitrogen atom, R5 is present only when X is a nitrogen atom, and represents a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms, and each of the pairs of R1 and R2, and R3 and R4 may combine with each other to form a cyclic structure.

However, Jàsne et al. teaches an organic semiconductor mainly comprising an electrically conducting polymer obtained by doping a dopant into a polymer containing a repeating unit represented by the following formula (1) **(fig. I; column 4, lines 42-54; column 9, lines 19-29)**:

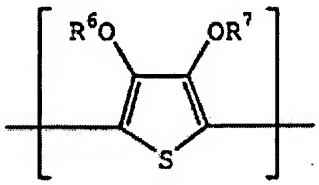


wherein R1**(R1)** to R3 **(R2)** each independently represents a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms **(column 4, lines 31-32)**, X represents an oxygen atom, a sulfur atom or a nitrogen atom **(column 3, lines35-40)**, R3 is present

only when X is a nitrogen atom **(column 3, lines 35-40)**, and represents a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms **(column 4, line 41)**, and each of the pairs of R1 and R2 may combine with each other to form a cyclic structure **(column 4, lines 33-35).**

11. Given the teachings of Jasne et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the electrolytic capacitor having a conductive polymer of Tsuchiya et al. with an aromatic heterocyclic compound with repeating units as an electrically conducting polymer taught by Jasne et al. Doing so would provide a stable conductive polymeric material.

Regarding claim 11, Tsuchiya et al. invention discloses all of the claimed limitations from above but fails to teach wherein the electrically conducting polymer containing a repeating unit represented by formula (1) is an electrically conducting polymer containing a structure unit represented by the following formula (3) as a repeating unit:



(3)

wherein R6 and R7 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated alkyl group having from 1 to 6 carbon atoms, or a substituent for forming at least one 5-, 6- or 7-membered saturated hydrocarbon cyclic

structure containing two oxygen atoms when the alkyl groups are combined with each other at an arbitrary position, and the cyclic structure includes a structure having a vinylene bond which may be substituted, and a phenylene structure which may be substituted.

However, Jasne et al. teaches the electrically conducting polymer containing a structure unit represented (3) as a repeating unit, wherein R6 **(R1)** and R7 **(R2)** each independently represents a hydrogen atom **(column 4, lines 14-15, line 31, lines 35-40, & lines 53-54).**

12. Given the teachings of Jasne et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the electrolytic capacitor having a conductive polymer of Tsuchiya et al. with an aromatic heterocyclic compound, with hydrogen atoms as substituents, as an electrically conducting polymer taught by Jasne et al. Doing so would provide a stable conductive polymeric material.

Regarding claim 12, Tsuchiya et al. discloses the electrically conducting polymer is selected from polyaniline, polyoxyphenylene, polyphenylene sulfide, polythiophene **(column 4, lines 20-29)**, polyfuran, polypyrrole **(column 4, lines20-29; column 9, line 65)**, polymethylpyrrole, and substitution derivatives and copolymers thereof.

Regarding claim 13, Tsuchiya et al. discloses wherein the electrically conducting polymer is poly (3,4-ethylenedioxythiophene) **(column 4, lines 20-23 & 26-29).**

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention: **Fournier et al., Abe et al., Naraya et al., & Brenneman et al.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LaTanya Crawford whose telephone number is (571) 270-3208. The examiner can normally be reached on Monday-Friday 7:30 AM -5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrell McKinnon can be reached on (571) 272-4797. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LaTanya Crawford

June 18, 2007

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